

SEP 14 1943

CS(E)107-43

Refrigeration-Condensing-Units; Electric, Commercial

U. S. DEPARTMENT OF COMMERCE

JESSE H. JONES, Secretary

NATIONAL BUREAU OF STANDARDS

LYMAN J. BRIGGS, Director

COMMERCIAL ELECTRIC-REFRIGERATION CONDENSING UNITS

COMMERCIAL STANDARD (EMERGENCY) CS(E)107-43

Effective date for new production from May 15, 1943



A RECORDED VOLUNTARY STANDARD
OF THE TRADE

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1943

PROMULGATION
of
COMMERCIAL STANDARD (EMERGENCY)
CS(E)107-43
for
COMMERCIAL ELECTRIC-REFRIGERATION
CONDENSING UNITS

On June 23, 1942, at the instance of the Standard Refrigeration Compressor Association, a representative conference of manufacturers adjusted and adopted a recommended commercial standard for commercial electric-refrigeration condensing units, which was subsequently revised to suit composite comment resulting from its circulation on July 8, 1942, to manufacturers, distributors, installers, contractors, and users. The adjusted draft was circulated on October 21, 1942, to the entire trade for written acceptance.

Those concerned have since accepted and approved the standard as shown herein for promulgation by the United States Department of Commerce, through the National Bureau of Standards.

The standard is effective for new production from May 15, 1943.

Promulgation recommended.

I. J. Fairchild,
Chief, Division of Trade Standards.

Promulgated.

Lyman J. Briggs,
Director, National Bureau of Standards.

Promulgation approved.

Jesse H. Jones,
Secretary of Commerce.

U. S. DEPARTMENT OF COMMERCE

NATIONAL BUREAU OF STANDARDS

WASHINGTON

ADDRESS REPLY TO
NATIONAL BUREAU OF STANDARDS

IJF:bc

July 16, 1943

IN YOUR REPLY
REFER TO FILE

XI-2/spc

To Users, Distributors, Installers,
and Manufacturers of
Refrigeration Condensing Units.

Subject: Refrigeration Condensing Units,
CS(E)107-43 -
Extension of Effective Date

Gentlemen:

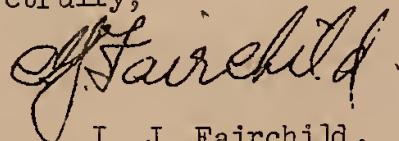
Under date of June 24, 1943, the manufacturers recommended that the effective date of Commercial Electric-Refrigeration Condensing Units, Commercial Standard (Emergency) CS(E)107-43, be extended from May 15, 1943, to six months after cessation of actual hostilities, or to such earlier date as may be recommended by the Standing Committee, for the following reasons:

- (1) It is a practical impossibility under present emergency conditions to obtain all of the necessary materials for compliance; and
- (2) It is impracticable to make the engineering charges in design and construction required for conformance with the standard.

Agreeable to the above request in the war emergency, and with the approval of the Standing Committee, the effective date for new production of commercial electric-refrigeration condensing units according to Commercial Standard CS(E)107-43, is hereby extended from May 15, 1943, to six months after the cessation of actual hostilities or to such earlier date as may be recommended by the Standing Committee.

In the meantime, it is understood that the manufacturers will comply with the requirements of the commercial standard as completely as practicable under the existing conditions.

Respectfully,



I. J. Fairchild,
Chief, Division of Trade Standards

COMMERCIAL ELECTRIC-REFRIGERATION CONDENSING UNITS

COMMERCIAL STANDARD (EMERGENCY) CS(E)107-43

PURPOSE

1. The purpose of this commercial standard is to establish minimum standard specifications and methods of test for commercial electric-refrigeration condensing units (all applications) for the guidance of manufacturers, distributors, installers, contractors, and users.

SCOPE

2. This standard covers requirements, rating, motor loading, and testing of air-cooled and water-cooled, belt-driven commercial electric-refrigeration condensing units, in $\frac{1}{2}$ - to 3-hp sizes, and water-cooled units of 5 hp, using methyl chloride, Freon 12, or SO_2 refrigerants. This standard covers all applications, including air conditioning. It covers minimum requirements for controls, shutoff valves and receiver-tank capacities. It also covers a uniform method of guaranteeing compliance with the standard and installation and service pointers. For purposes of field selection the machines are divided into three groups, as follows:

Group	Ranges of evaporating temperatures (saturated vapor temperatures corresponding to pressures measured at inlet to the compressor) (5° steps) as published
(1) Low temperature.....	Minus 25° F to 0° F.
(2) Medium temperature.....	0° F to plus 25° F.
(3) High temperature.....	Plus 25° F to plus 45° F

DEFINITION

3. *Manufacturer*.—A manufacturer, for the purpose of this commercial standard, shall be the company or organization which evidences its responsibility by all of the following:

- (1) Being a prime fabricator of commercial refrigeration machines,
- (2) Qualifying as such by the machining of rough compressor castings, and
- (3) Affixing its name or its distributor's name and/or nationally registered trade-mark or trade name to the compressor or condensing unit.

GENERAL REQUIREMENTS

4. *Safety*.

4a. The condensing unit shall meet the safety standards of Underwriters' Laboratories, Inc., Standard for Unit Refrigerating Systems, Standard for Air-Conditioning and Commercial Refrigerating Equipment (both Subj. 207), December 1941, Standard for Industrial Control Equipment, July 1938, and subsequent revisions.

4b. Presence on the condensing unit of label of Underwriters' Laboratories, Inc., shall be accepted as evidence of compliance with this safety requirement.

5. *Quietness.*—The unit shall be reasonably free from disturbing mechanical sound.

6. *Radio interference.*—The unit shall cause no unreasonable amount of radio interference.

7. *Manuals.*—The manufacturer shall have available a service and installation manual for his authorized dealers.

DETAIL REQUIREMENTS

8. *Condenser cooling medium.*—Condensing units one-fifth to 3 hp are either air, or water-cooled. Five-horsepower units are water-cooled only.

9. *Standard equipment.*—The standard equipment for commercial electric-refrigeration condensing units shall be as shown in table 1.

TABLE 1.—Standard equipment as furnished by the manufacturer for commercial electric-refrigeration condensing units, belt-driven

Horsepower.....	Air-cooled		Water-cooled	
	$\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1 (single-phase only)	1 $\frac{1}{2}$, 2, 3 (single-or 3-phase)	$\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{4}$, 1 (single-phase only)	1 $\frac{1}{2}$, 2, 3, 5 (single-or 3-phase)
Compressor with flywheel.....	Yes.....	Yes.....	Yes.....	Yes.....
Condenser.....	do.....	do.....	do.....	Do.....
Receiver (may be combined with condenser) except where application does not require receiver.....	do.....	do.....	do.....	Do.....
Motor.....	do.....	do.....	do.....	Do.....
Motor starter ¹	No.....	do.....	No.....	Do.....
Thermal overload protection other than fuses.....	Yes.....	do.....	Yes.....	Do.....
High-pressure cutout.....	No.....	No.....	do.....	Do.....
Refrigerant charge—"Holding," lb.....	1, 1 $\frac{1}{2}$, 2, 3, 5.....	5.....	2, 3, 3 $\frac{1}{2}$, 5.....	5.....
Belt guard, remote type only.....	Yes.....	Yes.....	Yes.....	Yes.....
Oil charge.....	do.....	do.....	do.....	Do.....
Low-pressure or temperature control, remote type only.....	do.....	do.....	do.....	Do.....
Service valves.....	do.....	do.....	do.....	Do.....
Fusible element or relief valve.....	do.....	do.....	do.....	Do.....
Water-regulating valve.....	do.....	do.....	do.....	Do.....
Belt or belts.....	Yes.....	Yes.....	do.....	Do.....
Condenser fan.....	do.....	do.....	do.....	Do.....
Base.....	do.....	do.....	Yes.....	Yes.....
Liquid shutoff valve.....	do.....	do.....	do.....	Do.....
Wiring between temperature or pressure control and motor.....	do.....	do.....	do.....	Do.....
Name plate.....	do.....	do.....	do.....	Do.....

¹ Across-the-line starters must be supplied where the temperature or pressure control is not capable of starting and stopping the motor directly.

10. Condensing units.

10a. Published figures of the temperature-capacity ratings of a given condensing unit shall be in 5-degree increments covering at least one of the three groups, as follows:

Group	Ranges of evaporating temperatures (saturated vapor temperatures corresponding to pressures measured at inlet to the compressor)
(1) Low temperature.....	Minus 25° F to 0° F.
(2) Medium temperature.....	0° F to plus 25° F.
(3) High temperature.....	Plus 25° F to plus 45° F.

10b. For rating purposes, the machines shall be tested in accordance with the methods of test outlined in American Society of Refrigerating Engineers "Standard Methods of Rating and Testing Mechanical Condensing Units, Circular No. 14," using test temperatures of the nearer ASRE group for any evaporating temperature at which the test is made.

10c. Additional ratings at other ambients may be listed if so desired.

11. Motors.

11a. For the purpose of determining maximum motor horsepower, no condensing unit of 5 hp or less shall require more than the horsepower shown in table 2, when tested for performance at rated voltage and at 5 degrees above the highest evaporating temperature of the group into which the particular condensing unit on test falls (see par. 11b 5).

11b. Conditions for determining maximum motor load.

- (1) Water-inlet temperature of water-cooled units 75° F.
- (2) Water-outlet temperature of water-cooled units 95° F.
- (3) Suction gas (refrigerant vapor entering the compressor) superheated to 65° F.
- (4) An ambient temperature of 110° F for both self-contained-type and remote-type units, air- and water-cooled.
- (5) Evaporating temperature (saturated-vapor temperature corresponding to pressure measured at inlet to the compressor) in each group shall be as follows:
 - (a) Low temperature, plus 5° F.
 - (b) Medium temperature, plus 30° F.
 - (c) High temperature, plus 50° F.

11c. The maximum motor loading for each size of unit shall be as shown in table 2.

TABLE 2.—Peak test loading for all single-phase motors and for polyphase* 1½ hp and larger

Motor name-plate horsepower rating	Brake horsepower at motor shaft (peak test load, as determined from paragraphs 11a and 11b)	Motor name-plate horsepower rating	Brake horsepower at motor shaft (peak test load, as determined from paragraphs 11a and 11b)	Motor name-plate horsepower rating	Brake horsepower at motor shaft (peak test load, as determined from paragraphs 11a and 11b)
1/8.....	0.375	3/4.....	1.17	3.....	4.5
1/4.....	.43	1.....	1.5	5.....	7.0
1/2.....	.56	1½.....	2.25		
3/4.....	.80	2.....	3.00		

* Due to their low starting torque, polyphase motors of less than 1½ hp are usually one size larger than shown in table 2 for a given peak test load.

11d. Motors used on commercial electric refrigeration condensing units shall conform to the standards of the National Electrical Manufacturers Association as given in part on pages 4 and 5.

11e. Other motor requirements shall be in accordance with NEMA Motor Standards.

12. Controls.

12a. Each condensing unit shall be equipped with controls, as specified in table 1.

13. *Receiver tanks*.—The minimum volume for receiver tanks shall be as given in table 3.

TABLE 3.—*Minimum receiver-tank volume*

Horsepower	Remote-type units	Self-contained-type units	Horsepower	Remote-type units	Self-contained-type units
	<i>Cu in.</i>	<i>Cu in.</i>		<i>Cu in.</i>	<i>Cu in.</i>
1/8.....	55	55	1.....	325
1/4.....	55	55	1 1/2.....	450
1/2.....	75	75	2.....	550
1.....	100	100	3.....	700
3/4.....	250	5.....	1,000

14. *Shutoff valves*.—Minimum standards for shutoff valves shall be as shown in tables 4, 5, 6, 7, and 8.

15. NEMA Standards (condensed).

15a. Motors used on commercial electric refrigeration units shall be of the general purpose type and shall comply in every respect with National Electrical Manufacturers Association Motor and Generator Standards (Publication No. 41-64 and superseding issues) as follows:

Small power motors, direct current..... MG8-30 to MG8-72, incl.
 Small power motors, alternating current.. MG8-80 to MG8-132, incl.
 Large power motors, direct current..... MG9-10 to MG9-115, incl.
 Large power motors, single phase..... MG9-310 to MG9-414, incl.
 Large power motors, polyphase induction. MG9-510 to MG9-619, incl.

15b. The following extracts taken from NEMA Motor and Generator Standards, Publication 41-64, for alternating-current motors are given as an indication of the more pertinent items to be considered in determining whether or not a given motor as applied meets the requirements:

PERFORMANCE STANDARDS

15b. (1) *MG8-100 temperature rise*.—The temperature rise of each of the various parts, above the temperature of the cooling medium, shall not exceed the values given in the following tabulation:

Class of insulation.....	O	A
Load, percentage of rated capacity.....	100	100
Time rating.....	Continuous	
Temperature rise:		
1. Coil windings, cores, and mechanical parts in contact with or adjacent to insulation.		
(a) General-purpose motors.....		40° C
(b) Totally enclosed and totally enclosed fan-cooled motors.....		55° C
(c) Motors and generators other than (a) and (b).....	35° C	50° C
2. Commutators and collector rings.		
(a) General-purpose motors.....		55° C
(b) Totally enclosed and totally enclosed fan-cooled motors.....		65° C
(c) Motors and generators other than (a) and (b).....	50° C	65° C
3. Miscellaneous parts (such as brush holders, brushes, pole tips, etc.) other than those whose temperatures affect the temperature of the insulating material may attain such temperatures as will not be injurious in any other respect.		
4. Squirrel-cage windings may attain such temperatures as will not occasion mechanical injury to the machine.		

NOTE I.—No overload temperature guarantee given.

NOTE II.—See MG4-10 for descriptive specification covering class *A* and class *O* insulation.

NOTE III.—All temperature measurements by the thermometer method.

NOTE IV.—All temperature rises are based on an ambient temperature of 40° C. General guarantees do not apply and deterioration of insulation may be expected, if this ambient temperature is exceeded in regular operation.

NOTE V.—See MG4-11 for descriptive specification of temperature rating.

NOTE VI.—See MG3-25.

NOTE VII.—The Underwriters' Laboratories, Inc. approves certain motor-driven appliances under a definite duty cycle and under such conditions permit the motor to have a 65° C temperature rise in a 24° C ambient.

Adopted Standard (Maximum Limit) 2-19-42

15b. (2) *MG8-101 minimum efficiencies, power factors, and apparent efficiencies.*¹—The efficiency, power factor, and apparent efficiency of the following ratings shall not be less than the values given below at rated voltage, frequency, and load.

2, 4, 6 and 8-pole, 60-cycle motors, single-phase

(a) General-purpose

Rating hp	Efficiency Percent				Power factor Percent				Apparent efficiency Percent			
	Speed, rpm				Speed, rpm				Speed, rpm			
	3,600	1,800	1,200	900	3,600	1,800	1,200	900	3,600	1,800	1,200	900
$\frac{1}{8}$ -----	45	53	45	38	57	52	43	36	28	30	21	15
$\frac{1}{6}$ -----	49	58	49	42	62	56	46	38	34	36	25	18
$\frac{1}{4}$ -----	53	61	53	45	66	59	49	40	39	41	29	20
$\frac{1}{3}$ -----	54	63	54	46	67	61	50	41	41	44	31	22
$\frac{1}{2}$ -----	55	65	55	47	69	63	52	43	44	47	33	23
$\frac{3}{4}$ -----	57	67	57	49	72	65	53	44	46	49	34	24

¹ The power factor and efficiency must not be less than the values shown and such that their product is not less than the values given for apparent efficiency.

16. *Production tests on units.*

16a. Each unit shall be manufactured so that—

- (1) Proper alinement between motor and compressor flywheel is assured.
- (2) All parts are interchangeable with like parts on like models.
- (3) Complete system is dehydrated.

16b. Each unit shall be tested so that—

- (1) The motor load shall not exceed the requirements herein.
- (2) The refrigerating capacity of the condensing unit shall conform to the limits of the group for which designed.
- (3) Controls and shutoff valves function properly.

16c. Each assembled unit shall be bench-tested and adjusted for a suitable period of time to reveal and eliminate—

- (1) Oil leaks.
- (2) Refrigerant leaks.
- (3) Electrical defects.
- (4) Excessive mechanical noise and vibration.
- (5) Other defects.

TABLE 4.—Liquid shut-off valves ¹

Horsepower	Type of unit	Type	Receiver connection ²	Tube size, OD	Tube connection	Single or back seat	Stem end
1/8	Self-contained	Angle or straight (welded, brazed, soldered, or forged). ³	Male pipe thread, 1/4 in.	1/4 in.	SAE flare or compression.	Single seat	1/4 in. sq.
1/4	Remote	do	do	1/4	do	do	Do.
1/4	Self-contained	do	do	1/4	do	do	Do.
1/4	Remote	do	do	1/4	do	do	Do.
1/8	Self-contained	do	do	1/4	do	do	Do.
1/8	Remote	do	do	1/4	do	do	Do.
1/2	Self-contained	do	do	1/4	do	do	Do.
1/2	Remote	do	do	1/4	do	do	Do.
3/4	Remote	do	Male pipe thread, 3/8 in.	3/8	do	do	Do.
1	do	do	do	3/8	do	do	Do.
1 1/2	do	do	do	3/8	SAE flare, compression or soldered.	do	Do.
2	do	do	do	1/2	do	do	Do.
3	do	do	do	1/2	do	do	Do.
5	do	do	Male pipe thread, 1/2 in.	5/8	do	do	Do.

¹ The manufacturer is at liberty to use standard compressor shutoff valves for liquid shutoff valves where desired.

² Receiver connection applies only to pipe-thread valve connection at receiver.

³ Or liquid receiver valve with 1/4-in. or 3/8-in. SAE male inlet from condenser to receiver and 1/4-in. SAE male liquid outlet line connection—1/4-in.-OD dip tube. Dip tube OD same as liquid line OD.

TABLE 5.—Suction shut-off valves

Horsepower	Type of unit	Type	No. of	Bolts		Tube size, OD	Tube connection	Single or back seat	Gage outlet	Stem end
				Size	Hole centers					
1/8	Self-contained	Flange	2	1/16 in.	1 1/8 in.	3/8 in.	SAE flare, compression or soldered.	Back seat	1/8 female pipe thread	1/4 in. sq.
1/4	Remote	do	2	5/16	1 5/8	3/8	do	do	do	Do.
1/4	Self-contained	do	2	5/16	1 5/8	3/8	do	do	do	Do.
1/4	Remote	do	2	5/16	1 5/8	3/8	do	do	do	Do.
1/8	Self-contained	do	2	5/16	1 5/8	3/8	do	do	do	Do.
1/8	Remote	do	2	5/16	1 5/8	1/2	do	do	do	Do.
1/2	Self-contained	do	2	5/16	1 5/8	1/2	do	do	do	Do.
1/2	Remote	do	2	5/16	1 5/8	1/2	do	do	do	Do.
3/4	Remote	do	2	5/16	1 5/8	5/8	do	do	do	Do.
1	do	do	2	5/16	1 5/8	5/8	do	do	do	Do.
1 1/2	do	do	2	5/16	1 5/8	3/4	Soldered	do	do	5/16 in. sq.
2	do	do	2	5/16	1 5/8	3/4	do	do	do	Do.
3	do	do	2	1/2	2 3/4	1 1/8	do	do	do	3/8 in. sq.
5	do	do	4	1/2	2 1/2	1 3/8	do	do	do	1/2 in. sq.

TABLE 6.—Discharge shut-off valves ¹

Horsepower	Type of unit	Type	No. of	Bolts		Tube size, OD	Tube connection	Single or back seat	Gage outlet	Stem end
				Size	Hole centers					
	Self-contained	Flange	2	$\frac{1}{2}$ in.	$\frac{1}{2}$ in.	$\frac{3}{8}$ in.	SAE flare, compression, or soldered.	Back seat	$\frac{1}{8}$ female pipe thread.	$\frac{1}{4}$ in. sq.
$\frac{1}{8}$	Remote	do	2	$\frac{5}{16}$	$\frac{1}{8}$	$\frac{3}{8}$	do	do	do	Do.
$\frac{1}{4}$	Self-contained	do	2	$\frac{5}{16}$	$\frac{1}{8}$	$\frac{3}{8}$	do	do	do	Do.
	Remote	do	2	$\frac{5}{16}$	$\frac{1}{8}$	$\frac{3}{8}$	do	do	do	Do.
$\frac{1}{2}$	Self-contained	do	2	$\frac{5}{16}$	$\frac{1}{8}$	$\frac{3}{8}$	do	do	do	Do.
	Remote	do	2	$\frac{5}{16}$	$\frac{1}{8}$	$\frac{3}{8}$	do	do	do	Do.
$\frac{3}{4}$	Self-contained	do	2	$\frac{5}{16}$	$\frac{1}{8}$	$\frac{1}{2}$	do	do	do	Do.
	Remote	do	2	$\frac{5}{16}$	$\frac{1}{8}$	$\frac{1}{2}$	do	do	do	Do.
1	do	do	2	$\frac{5}{16}$	$\frac{1}{8}$	$\frac{5}{8}$	do	do	do	Do.
$1\frac{1}{2}$	do	do	2	$\frac{5}{16}$	$\frac{1}{8}$	$\frac{5}{8}$	do	do	do	Do.
2	do	do	2	$\frac{5}{16}$	$\frac{1}{8}$	$\frac{3}{4}$	Soldered	do	do	$\frac{5}{16}$ in. sq.
3	do	do	2	$\frac{5}{16}$	$\frac{1}{8}$	$\frac{3}{4}$	do	do	do	Do.
5	do	do	2	$\frac{1}{2}$	$\frac{23}{32}$	$1\frac{1}{8}$	do	do	do	$\frac{3}{8}$ in. sq.

¹ Where two discharge valves are furnished, they shall be standard valves having equivalent or greater outlet-tube area than specified.

TABLE 7.—Receiver shut-off valves ¹

Water-cooled condensing units

Horsepower	Type of unit	Type	Receiver connection ²	Tube size, OD	Tube connection	Single or back seat	Stem end
$\frac{1}{8}$	Remote	Angle (welded, brazed, soldered or forged)	Weld or $\frac{3}{8}$ in. MPT. ³	$\frac{1}{2}$ in.	SAE flare or compression.	Single seat	$\frac{1}{4}$ in. sq.
$\frac{1}{4}$	do	do	do	$\frac{1}{2}$	do	do	Do.
$\frac{3}{4}$	do	do	do	$\frac{1}{2}$	do	do	Do.
1	do	do	$\frac{1}{2}$ in. MPT.	$\frac{5}{8}$	SAE flare, compression, or soldered.	do	Do.
$1\frac{1}{2}$	do	do	do	$\frac{5}{8}$	do	do	Do.
2	do	do	$\frac{3}{4}$ in. MPT.	$\frac{3}{4}$	Soldered	do	$\frac{5}{16}$ in. sq.
3	do	do	do	$\frac{3}{4}$	do	do	Do.
5	do	Flange	$\left\{ \begin{array}{l} 2\frac{1}{2}\text{-in. bolt center} \\ 2\frac{3}{4}\text{-in. bolt center} \end{array} \right\}$	$1\frac{1}{8}$	do	Back seat	$\frac{3}{8}$ in. sq.

¹ The manufacturer is at liberty to use standard compressor shutoff valves for receiver shutoff valves where desired. If two receiver valves are furnished, they shall be standard valves of equivalent or greater outlet-tube area than specified.

² Receiver connection applies only to pipe-thread valve connection.

³ Male pipe thread.

TABLE 8.—Receiver shutoff valves¹

[Air-cooled condensing units]

Horsepower	Type of unit	Type	Receiver connection	Tube size, OD	Tube connection	Single or back seat	Stem end
$\frac{1}{8}$	Self-contained ²	Angle (welded, brazed, soldered, or forged)	$\frac{1}{4}$ -in. male pipe thread.	$\frac{1}{4}$ in.	SAE flare or compression.	Single seat	$\frac{1}{4}$ in. sq.
$\frac{1}{4}$	Remote ²	do	do	$\frac{1}{4}$	do	do	Do.
$\frac{1}{4}$	Self-contained ²	do	do	$\frac{1}{4}$	do	do	Do.
$\frac{1}{4}$	Remote ²	do	do	$\frac{1}{4}$	do	do	Do.
$\frac{1}{4}$	Self-contained ²	do	do	$\frac{1}{4}$	do	do	Do.
$\frac{1}{4}$	Remote ²	do	do	$\frac{1}{4}$	do	do	Do.
$\frac{1}{2}$	Self-contained ²	do	do	$\frac{1}{4}$	do	do	Do.
$\frac{1}{2}$	Remote ²	do	do	$\frac{1}{4}$	do	do	Do.
$\frac{3}{4}$	Remote ²	do	$\frac{3}{8}$ in. MPT	$\frac{3}{8}$	do	do	Do.
1	do	do	do	$\frac{3}{8}$	do	do	Do.
$1\frac{1}{2}$	do	do	do	$\frac{1}{2}$	do	do	Do.
2	do	do	do	$\frac{1}{2}$	do	do	Do.
3	do	do	$\frac{1}{2}$ in. MPT	$\frac{1}{2}$	SAE flare, compression, or soldered.	do	Do.

¹ The manufacturer is at liberty to use standard compressor shutoff valves for receiver shutoff valves where desired. If two receiver valves are furnished, they shall be standard valves of equivalent or greater outlet tube area than specified.

² When a combination liquid receiver-liquid line shutoff valve is used as shown in footnote 3 of table 4 or a standard liquid line shutoff valve is used, this receiver shutoff valve is not required.

LABELING

17. The name of the manufacturer or distributor, model number, refrigerant used, and serial number shall be shown in a conspicuous place on each unit.

18. *Warranty.*—The condensing unit shall be warranted by the condensing unit manufacturer against defects of material and workmanship for a period of 90 days from date of installation.

19. *Guarantee of compliance.*—In order that purchasers of condensing units may be assured that these units comply with the requirements of this standard as a basis for fair competition, it is recommended that the following statement be included in manufacturers' and/or distributors' warranties, labels, invoices, contracts, sales literature, etc.:

This refrigeration condensing unit complies with all requirements of Commercial Standard (Emergency) CS(E)107-43, as issued by the National Bureau of Standards, of the United States Department of Commerce.

INSTALLATION AND SERVICE INSTRUCTIONS

20. It is recommended that a copy of the following "Installation and Service Instructions" be furnished with each refrigeration condensing unit.

Be sure to study these important pointers.

IMPORTANT.—This unit is constructed of high-grade materials, built by modern precision methods, every part carefully gaged and inspected, and the entire unit tested. When it left the factory, it was free of foreign matter and thoroughly dehydrated. Careless or thoughtless installation methods may nullify all the care, expense, and planning that went into the building of this unit. A careful and efficient installation will enable it to give the years of satisfactory use for which it was designed. **IT IS NOW UP TO YOU, THE INSTALLER.**

<i>Check List</i>	<i>Instructions</i>
Location.....	Place condensing unit where it has a free circulation of cool air. If a water-cooled unit do not install where it will be subjected to freezing temperatures.
Motor lubrication.....	Lubricate motor bearings before starting this unit. Use only lubricant of the grade recommended by the motor manufacturer.
Electrical specifications.....	Check name plate on motor and controls to be certain that motor is being connected to circuit supplying the correct current.
Line protection.....	Use line fuses of proper rating (See National Electrical Safety Code).
Pulley alinement.....	Make certain that pulleys are in alinement and that belt is adjusted to proper tension.
Compressor rotation.....	Check direction of rotation of compressor as indicated by arrow on unit.
Cleaning evaporator lines.....	Be sure evaporator and lines are dry and clean. If they have stood open, blow out with CO ₂ and bake dry.
Strainer.....	The use of a suction or liquid line strainer for protection of the system is recommended.
Drying evaporator lines.....	Use only suction or liquid line dryers to remove moisture. Use dryers which have been recommended by the condensing unit manufacturer.
Remove moisture-laden air...	Draw a deep no-bubble vacuum on the entire refrigeration system before charging with refrigerant, using a vacuum pump designed for that purpose.
Compressor lubrication.....	Check the compressor oil level after condensing unit has operated a few hours, and add oil as required to make up for that in the lines and evaporator. Use only clean, dry oil in sealed cans approved by the manufacturer of this condensing unit.

<i>Check List</i>	<i>Instructions</i>
Leak test-----	Test all joints carefully for leaks. Make certain that the entire system is gas tight.
Expansion-valve adjustment--	Check adjustment of expansion valve and reset if necessary to keep liquid refrigerant from returning to the compressor. Be sure to use the proper size valve.
Refrigerant requirements-----	Use only refrigerant specified on unit name plate, that is clean and dry. If refrigerant is changed on approval of the unit manufacturer, remove old refrigerant and compressor oil, put in new approved oil, and pump a deep vacuum before charging with new refrigerant.
Installation recheck-----	Before leaving the installation as complete, recheck temperature, valve settings, and general operation, always using gages. See that service-valve caps, control covers, and other loose parts are in place. Also recheck pressures, compressor oil level, and the motor oil.
User instructions-----	Instruct the customer or user in the care and operation of this unit—how to oil motor, and replace fuses or reset overload. Leave your name, address, and telephone numbers, day and night, posted near the unit.

EFFECTIVE DATE

21. The standard is effective for new production from May 15, 1943.

STANDING COMMITTEE

The following individuals comprise the membership of the standing committee, which is to review, prior to circulation for acceptance, revisions proposed to keep the standard abreast of progress. Each organization nominated its own representative. Comment concerning the standard and suggestions for revision may be addressed to any member of the committee or to the Division of Trade Standards, National Bureau of Standards, which acts as secretary for the committee.

Manufacturers:

- F. E. JERNBERG (chairman), Commercial Refrigeration Division, Mills Novelty Co., 4100 Fullerton Avenue, Chicago, Ill.
 FRANK H. FAUST, Air Conditioning and Commercial Refrigeration Department, General Electric Co., 5 Lawrence St., Bloomfield, N. J.
 C. E. PLOEGER, Electric Refrigeration and Air Conditioning Division, Servel, Inc., Evansville, Ind.
 F. K. SMITH, Tecumseh Products Co., Tecumseh, Mich.
 A. E. CADWELL, Universal Cooler Corporation, Marion, Ohio.
 C. P. SPALDING, Yates-American Machine Co., Beloit, Wis.

Distributors and Installers:

- ALEX H. HOLCOMBE, JR., Victor Sales & Supply Co., 2222 Arch St., Philadelphia, Pa.
 H. S. McCloud, Williams and Co., Inc., Cincinnati, Ohio.
 GEORGE J. ROCHE, Parks & Hull Appliance Corporation, 1029 Cathedral St., Baltimore, Md.
 (Above 3 representing National Refrigeration Supply Jobbers Association).
 ERNEST GYGAX, 5446 Claxton St., St. Louis, Mo.
 H. D. BUSBY, 2432 Hessing St., River Grove, Ill.
 F. C. STRONG, 81 Humbervale Blvd., Toronto, Ontario, Canada.
 (Above 3 representing Refrigeration Service Engineers Society).

Users:

- GEORGE K. BENTLY, McCray Refrigerator Co., Kendallville, Ind. (Representing Commercial Refrigerator Manufacturers Association).
 HENRY F. HOERSCHELMANN, H. C. Bohack Co., Metropolitan & Flushing Ave., Brooklyn, N. Y. (Representing National Association of Food Chains).
 J. H. BROADBENT, Rockefeller Center, Inc., 50 Rockefeller Plaza, New York, N. Y. (Representing National Association of Purchasing Agents).
 JOHN A. KOTAL, The National Association of Retail Meat Dealers, Inc., Suite 1900, 176 W. Adams St., Chicago, Ill.
 National Frozen Foods Locker Association, Hotel Fort Des Moines, Des Moines, Iowa. (Invited to name a representative.)

Laboratories and General Interests:

- GLENN MUFFLY, 132 S. Kensington Place, Springfield, Ohio.
 R. S. DILL, National Bureau of Standards, Washington, D. C.
 S. V. JAMES, Underwriters' Laboratories, Inc., 207 East Ohio St., Chicago, Ill.

HISTORY OF PROJECT

The Standard Refrigeration Compressor Association on August 9, 1941, requested the cooperation of the National Bureau of Standards in the establishment of a commercial standard for belt-driven, commercial electric-refrigeration condensing units. Several committees had previously drafted independent elements of the proposed standard, and, after suitable adjustments, four subcommittee reports were transmitted on April 15, 1942, to the National Bureau of Standards.

These reports formed the basis for a proposed commercial standard, which was circulated on May 30, 1942, to all manufacturers of record, interested Government agencies, and others, with an invitation to a conference. On June 23, 1942, a conference of interested manufacturers and Government agencies adjusted and adopted a revised draft, which was circulated broadly on July 8, 1942, to installers, users, distributors, manufacturers, and trade periodicals for comment.

Following suitable adjustment in line with the composite written comment, the revised draft was circulated on October 21, 1942, to the entire trade for written acceptance, as it appeared that there was substantial approval of the draft; and, for this reason, coupled with wartime emergency conditions, further conferences seemed unnecessary. Upon receipt of acceptances in writing from a preponderant majority, announcement was issued on February 15, 1943, that the standard would become effective for new production from May 15, 1943.

ACCEPTANCE OF COMMERCIAL STANDARD

If acceptance has not previously been filed, this sheet properly filled in, signed, and returned will provide for the recording of your organization as an acceptor of this commercial standard.

Date

Division of Trade Standards,
National Bureau of Standards,
Washington, D. C.

Gentlemen:

Having considered the statements on the reverse side of this sheet, we accept the Commercial Standard CS(E)107-43 as our standard of practice in the

Production ¹ Distribution ¹ Use ¹ Testing ¹

of commercial electric-refrigeration condensing units.

We will assist in securing its general recognition and use, and will cooperate with the standing committee to effect revisions of the standard when necessary.

Signature of individual officer
(In ink)

(Kindly typewrite or print the following lines)

Name and title of above officer

Organization
(Fill in exactly as it should be listed)

Street address

City and State

¹ Please designate which group you represent by drawing lines through the other three. Please file separate acceptances for all subsidiary companies and affiliates which should be listed separately as acceptors. In the case of related interests, trade papers, colleges, etc., desiring to record their general approval, the words "in principle" should be added after the signature.

TO THE ACCEPTOR

The following statements answer the usual questions arising in connection with the acceptance and its significance:

1. *Enforcement.*—Commercial standards are commodity specifications voluntarily established by mutual consent of those concerned. They present a common basis of understanding between the producer, distributor, and consumer and should not be confused with any plan of governmental regulation or control. The United States Department of Commerce has no regulatory power in the enforcement of their provisions, but since they represent the will of the interested groups as a whole, their provisions through usage soon become established as trade customs, and are made effective through incorporation into sales contracts by means of labels, invoices and the like.

2. *The acceptor's responsibility.*—The purpose of commercial standards is to establish for specific commodities, nationally recognized grades or consumer criteria and the benefits therefrom will be measurable in direct proportion to their general recognition and actual use. Instances will occur when it may be necessary to deviate from the standard and the signing of an acceptance does not preclude such departures; however, such signature indicates an intention to follow the commercial standard where practicable, in the production, distribution, or consumption of the article in question.

3. *The Department's responsibility.*—The major function performed by the Department of Commerce in the voluntary establishment of commercial standards on a Nation-wide basis is fourfold: first, to act as an unbiased coordinator to bring all interested parties together for the mutually satisfactory adjustment of trade standards; second, to supply such assistance and advice as past experience with similar programs may suggest; third, to canvass and record the extent of acceptance and adherence to the standard on the part of producers, distributors, and users; and fourth, after acceptance, to publish and promulgate the standard for the information and guidance of buyers and sellers of the commodity.

4. *Announcement and promulgation.*—When the standard has been endorsed by a satisfactory majority of production or consumption in the absence of active, valid opposition, the success of the project is announced. If, however, in the opinion of the standing committee or the Department of Commerce, the support of any standard is inadequate, the right is reserved to withhold promulgation and publication.

ACCEPTORS

The organizations and individuals listed below have accepted this commercial standard as their standard of practice in the production, distribution, and use of commercial electric-refrigeration condensing units. Such endorsement does not signify that they may not find it necessary to deviate from the standard nor that producers so listed guarantee all of their products in this field to conform with the requirements of this standard. Therefore, specific evidence of conformity should be obtained where required.

ASSOCIATIONS

American Association of Engineers, Chicago, Ill.
 American Hotel Association, New York, N. Y. (In principle.)
 American Institute of Refrigeration, Chicago, Ill. (In principle.)
 American Railway Engineering Association, Chicago, Ill.
 Associated General Contractors of America, Inc., The, Washington, D. C.
 Hyde Park Breweries Association, Inc., St. Louis, Mo.
 National Association of Purchasing Agents, New York, N. Y.
 National Refrigeration Supply Jobbers Association, Cincinnati, Ohio.
 New York Wholesale Fish Dealers Association, Inc., New York, N. Y.
 Northwest Produce Association, Inc., Seattle, Wash.
 Refrigeration Service Engineers' Society, Twin City Chapter, St. Paul, Minn. (In principle.)

FIRMS

A-1 Refrigeration Co., Milwaukee, Wis.
 Air Conditioning & Refrigeration Service, Chattanooga, Tenn.
 Aird-Don Co., Albany, N. Y.
 Alamo Refrigeration Co., San Antonio, Tex.
 Albany Packing Co., Inc., Albany, N. Y.
 All Service Co., Lincoln, Nebr.
 Allen, Carl R., Tallahassee, Fla.
 Allen Co., E. H., Charlestown, Mass.
 Alter Co., The Harry, Chicago, Ill., and New York, N. Y.
 American Airlines, Inc., Jackson Heights, N. Y.
 American Brewing Co. of Rochester, N. Y., Inc., Rochester, N. Y.

American Packing & Provision Co., Ogden, Utah.
 Anheuser-Busch, Inc., St. Louis, Mo.
 Appliance Engineering Corporation, Boston, Mass.
 Arbell Refrigeration Supplies, Fresno, Calif.
 Atchison, Topeka & Santa Fe Railway, Chicago, Ill.
 Automatic Heating & Cooling Supply Co., Chicago, Ill.
 Bader Supply Co., Tulsa, Okla.
 Ballantine & Sons, P., Newark, N. J.
 Bally Case & Cooler Co., Bally, Pa.
 Baltimore & Ohio Railroad Co., The, Baltimore, Md.
 Bastian-Blessing Co., The, Chicago, Ill.
 Baxter Co., Duluth, Minn.
 Better Living Co., Jackson, Miss.
 Blatz Brewing Co., Milwaukee, Wis.
 Bluepoints Co., Inc., West Sayville, N. Y.
 Bohack Co., Inc., H. C., Brooklyn, N. Y.
 Bowen Refrigeration Supplies, Inc., Atlanta, Ga., Jacksonville, Fla. and Tampa, Fla.
 Bowers Wholesale Corporation, Norfolk, Va.
 Brass & Copper Sales Co., St. Louis, Mo.
 Brunner Manufacturing Co., Utica, N. Y.
 Buckeye Brewing Co., The, Toledo, Ohio.
 Burk, Inc., Louis, Philadelphia, Pa.
 Burns, Lloyd R., Los Angeles, Calif.
 Bush Manufacturing Co., The, Hartford, Conn.
 California Refrigerator Co., San Francisco, Calif.
 Capital Electric Co., Topeka, Kans.
 Carrier Corporation, Syracuse, N. Y.
 Case & Son Manufacturing Co., W. A., Binghamton, N. Y.

- Central Railroad Co. of New Jersey, Philadelphia, Pa.
 Central Service Supply Co., Scranton, Pa., and Syracuse, N. Y.
 Chicago, Burlington & Quincy Railroad Co., Chicago, Ill.
 Chrysler Corporation, Airtemp Division, Dayton, Ohio.
 Clark's Store Fixtures, Flint, Mich.
 Commercial Refrigeration, Inc., St. Paul, Minn.
 Continental Refrigeration Service, Chicago, Ill.
 County Seat Plumbing Supply Co., Mt. Vernon, N. Y.
 Creamery Package Manufacturing Co., The, Chicago, Ill.
 Curtice Brothers Co., Rochester, N. Y.
 Curtis Manufacturing Co., Curtis Refrigerating Machine Division, St. Louis, Mo.
 De Laval Sales & Service, Inc., Poughkeepsie, N. Y.
 Debes Refrigeration Supply Co., Cleveland, Ohio.
 Dennis Refrigeration Supply, Sioux City, Iowa, and Des Moines, Iowa.
 Dick & Co., Inc., Henry V., Charlotte, N. C., and Columbia, S. C.
 Drying Systems, Inc., Chicago, Ill.
 Dunville & Bro., Robert M., Richmond, Va.
 Duquesne Brewing Co. of Pittsburgh, Pittsburgh, Pa.
 Eastern Airlines, Inc., Miami, Fla.
 Electra Distributing Co., Nashville, Tenn.
 Ever-Ready Refrigeration Co., Trenton, N. J.
 Fargo Food & Equipment Co., Fargo, N. Dak.
 Fideco Industries, Inc., New York, N. Y.
 Flint Distributing Co., Salt Lake City, Utah.
 Forslund Pump & Machinery Co., Kansas City, Mo.
 Franklin Brewing Co., The, Columbus, Ohio.
 Fricke Co., C. W., Rutherford, N. J.
 Friedrich, Inc., Ed., San Antonio, Tex.
 Gaffin Refrigeration Co. (Division of Gaffin Paper & Scale Co.), Worcester, Mass.
 Gay Engineering Corporation, Los Angeles, Calif.
 Gettelman Brewing Co., A., Milwaukee, Wis.
 Goetz Brewing Co., M. K., St. Joseph, Mo.
 Gold Star Products, Inc., Detroit, Mich.
 Gruenwald's of Philadelphia, Inc., Philadelphia, Pa.
 Hammond Standish & Co., Detroit, Mich.
 Hansen, Percy G., Akron, Ohio.
 Harris Fixture Co., Mobile, Ala.
 Harris & Son, B. F., Grand Rapids, Mich.
 Haverly Electric Co., Inc., Syracuse, N. Y.
 Heat & Power Engineering Co., The, Toledo, Ohio.
 Herrel & Sons, Inc., John, Columbus, Ohio.
 Herrick Refrigerator Co., Waterloo, Iowa.
 Hill-Lipman Co., Pittsburgh, Pa.
 Hoffman Beverage Co., Newark, N. J.
 Hoffman Supply Co., Springfield, Mo.
 Hospital Bureau of Standards & Supplies, Inc., New York, N. Y.
 Howe Ice Machine Co., Chicago, Ill.
 Hunter Packing Co., East St. Louis, Ill.
 Hygeia Refrigerating Co., Elmira, N. Y.
 Illinois Central Railroad, Chicago, Ill.
 Interstate Machinery & Supply Co., Omaha, Nebr.
 J. & J. Refrigerating Co., Chicago, Ill.
 Jackson Brewing Co., New Orleans, La.
 Jacobs & Gile, Inc., Refrigeration Department, Portland, Oreg.
 Jordan Equipment Co., Columbus, Ga.
 King Ventilating Co., Owatonna, Minn.
 Krueger Brewing Co., G., Newark, N. J.
 Kutil Refrigeration Service, Sioux City, Iowa.
 Langsenkamp Co., F. H., Indianapolis, Ind., and South Bend, Ind.
 Lauderback Co., The, Tampa, Fla.
 Leitner & Co., M., Chicago, Ill.
 Lingo Co., D. C., Houston, Tex.
 Lipman Refrigeration Co., Buffalo, N. Y.
 Lipman Refrigeration Sales & Service, Chicago, Ill.
 Lipman Sales Co., Drexel Hill, Pa.
 Liquid Carbonic Corporation, The, Chicago, Ill.
 Lynch Manufacturing Corporation, Defiance, Ohio.
 Machine Tool & Supply Co., Tulsa, Okla.
 Macy & Co., Inc., R. H., New York, N. Y.
 Marquette Equipment Co., Peoria, Ill.
 Marsden & Wasserman, Inc., Hartford, Conn.
 Matot, Inc., D. A., Chicago, Ill.
 McCombs Refrigeration Supply Co., Denver, Colo.
 McQuay, Inc., Minneapolis, Minn.
 Mellish & Murray Co., Chicago, Ill.
 Merchant & Evans Co., Philadelphia, Pa.
 Merkel Brothers, Co., The, Cincinnati, Ohio.
 Mideke Supply Co., Oklahoma City, Okla.
 Midwest Refrigeration & Fixture Co., Wichita, Kans.
 Miller & Seddon Co., Inc., Cambridge, Mass.
 Mills Novelty Co., Chicago, Ill.

- Minneapolis Show Case & Fixture Co., Minneapolis, Minn.
 Missouri State Chickeries, Jefferson City, Mo.
 Montgomery & Crawford, Inc., Spartanburg, S. C.
 Morrell & Co., John, Ottumwa, Iowa.
 Muffy, Glenn, Springfield, Ohio.
 Neislar Refrigeration Service, R. W., Fort Smith, Ark.
 New Jersey Hospital Dispensary, Orange, N. J.
 Norfolk & Western Railway Co., Roanoke, Va.
 Northern Pacific Railway Co., St. Paul, Minn.
 Northwest Baker Ice Machine Co., Seattle, Wash.
 Northwest Fixture Co., Billings, Mont.
 Nuckolls Packing Co., The, Pueblo, Colo.
 Ohio China Wholesale Co., Canton, Ohio.
 Orange Memorial Hospital, Orange, N. J.
 Osmon Refrigeration Co., F. F., Washington, Ind.
 Paramount Refrigeration Co., Louisville, Ky.
 Parks & Hull Appliance Corporation, Baltimore, Md.
 Payson Co., C. P., Springfield, Mass.
 Peglar Machinery Co., Chattanooga, Tenn.
 Pennsylvania Hospital, Philadelphia, Pa.
 Pennsylvania Railroad Co., Philadelphia, Pa.
 Percival Co., C. L., Boone, Iowa.
 Persbacher, H. W., Scranton, Pa.
 Pilsen Brewing Co., Chicago, Ill.
 Pittsburgh Testing Laboratory, Pittsburgh, Pa.
 Pixley Electric Supply Co., The, Columbus, Ohio.
 Plumbing Wholesale Co., Jackson, Miss.
 Potter & Rayfield, Inc., Atlanta, Ga.
 Producers Cooperative Packing Co., Salem, Ore.
 Puffer-Hubbard Manufacturing Co., Grand Haven, Mich.
 Quinn Co., L. J., Cincinnati, Ohio.
 R & R Butcher Supply Co., St. Louis, Mo.
 Rader, B. F., Berkeley, Calif. (In principle.)
 Railway & Engineering Specialties, Ltd., Montreal, Canada, and Toronto, Canada.
 Range Auto Parts, Inc., Johnson City, Tenn.
 Reading Co., Philadelphia, Pa.
 Reese, Inc., H. D., Philadelphia, Pa.
 Refrigeration Economics Co., Inc., Canton, Ohio.
 Refrigeration Equipment Co., Madison, Wis.
 Refrigeration & Industrial Supply Co., Inc., Minneapolis, Minn.
 Refrigeration Maintenance Corporation, Chicago, Ill., and Cleveland, Ohio.
 Refrigeration Service, Newark, N. J.
 Refrigeration Specialty Co., Milwaukee, Wis.
 Refrigeration Supplies Distributor, Los Angeles, Calif.
 Refrigeration Supply Co., Little Rock, Ark.
 Refrigerative Supply, Inc., Seattle, Wash.
 Reliance Refrigerating Machine Co., Inc., Chicago, Ill.
 Republic Electric Co., Davenport, Iowa.
 R E S C O, New Haven, Conn.
 Rock Modernized Refrigeration, Frank F., Wheeling, W. Va.
 Rocke International Electric Corporation, New York, N. Y.
 Rockefeller Center, Inc., New York, N. Y.
 Roosevelt Co., W. A., La Crosse, Wis.
 S. W. H. Supply Co., Inc., Louisville, Ky.
 Saint John's Hospital, Brooklyn, N. Y.
 Saint Louis Butchers Supply Co., St. Louis, Mo.
 Saint Louis-San Francisco Railway Co., St. Louis, Mo.
 Scatena York Co., San Francisco, Calif.
 Scheidt Brewing Co., Adam, Norristown, Pa.
 Schmidt Co., The C., Cincinnati, Ohio.
 Schreiber Brewing Co., Inc., Buffalo, N. Y.
 Schuld Refrigeration Service, Cleveland, Ohio.
 Schwenger Klein, Inc., Cleveland, Ohio.
 Sears, Roebuck & Co., Chicago, Ill.
 Servel, Inc., Evansville, Ind.
 Simplex Manufacturing Co., Oakland, Calif.
 Southern Pacific Co., San Francisco, Calif.
 Standard Brands, Inc., New York, N. Y.
 Standard Supply, Inc., Worcester, Mass.
 Staten Island Hospital, The, New York, N. Y.
 Stegmaier Brewing Co., Wilkes-Barre, Pa.
 Tecumseh Products Co., Tecumseh, Mich.
 Texas & Pacific Railway Co., Dallas, Tex.
 Thermal Co., Inc., Milwaukee, Wis., and St. Paul, Minn.
 Times Appliance Co., Inc., New York, N. Y.
 Tobin Packing Co., Inc., Ft. Dodge, Iowa.
 Trane Co., The, La Crosse, Wis.
 United Air Lines Transport Corporation, Chicago, Ill.
 United Electric Service Co., Wichita Falls, Tex.

- United Refrigerator Supply Co., Memphis, Tenn.
 United States Testing Co., Inc., Hoboken, N. J.
 Universal Cooler Corporation, Marion, Ohio.
 Universal Refrigeration Service, Chicago, Ill.
 Victor Sales & Supply Co., Philadelphia, Pa.
 Viking Sales & Service Co., Indianapolis, Ind.
 Vise Refrigeration Service, Columbia, S. C.
 Washington Frosted Foods, Inc., Seattle, Wash.
 Way Engineering Co., Houston, Tex.
 Webster Canning & Preserving Co., Inc., Webster, N. Y.
 West Bend Lithia Co., West Bend, Wis.
 White Co., J. Carl, Phoenix, Ariz.
 Wickham Supply Co., Lincoln, Nebr.
 Wilbur, Ivan, Hamden, Ohio.
 Williams & Co., Inc., Pittsburgh, Pa., and other cities.
 Williams Oil-O-Matic Heating Corporation, Bloomington, Ill.
 Winterbottom Supply Co., Waterloo, Iowa.
 Worthington Pump & Machinery Corporation, Harrison, N. J.
 Wright & Co., Atherton Division, Worcester, Mass.
 Yates-American Machine Co., Beloit, Wis.

U. S. GOVERNMENT

- Agriculture, U. S. Department of, Washington, D. C.
 War Department, Washington, D. C.

COMMERCIAL STANDARDS

- | CS. No. | Item | CS. No. | Item |
|-----------|--|---------|---|
| 0-40. | Commercial standards and their value to business (third edition). | 39-37. | Wool and part wool blankets (second edition) (Withdrawn as commercial standard, July 14, 1941). |
| 1-42. | Clinical thermometers (third edition). | 40-32. | Surgeons' rubber gloves. |
| 2-30. | Mopsticks. | 41-32. | Surgeons' latex gloves. |
| 3-40. | Stoddard solvent (third edition). | 42-35. | Fiber insulating board (second edition). |
| 4-29. | Staple porcelain (all-clay) plumbing fixtures. | 43-32. | Grading of sulphonated oils. |
| 5-40. | Pipe nipples; brass, copper, steel, and wrought iron. | 44-32. | Apple wraps. |
| 6-31. | Wrought-iron pipe nipples (second edition). Superseded by CS5-40. | 45-42. | Douglas fir plywood (fifth edition). |
| 7-29. | Standard weight malleable iron or steel screwed unions. | 46-40. | Hosiery lengths and sizes (third edition). |
| 8-41. | Gage blanks (third edition). | 47-34. | Marking of gold-filled and rolled-gold-plate articles other than watchcases. |
| 9-33. | Builders' template hardware (second edition). | 48-40. | Domestic burners for Pennsylvania anthracite (underfeed type) (second edition). |
| 10-29. | Brass pipe nipples. Superseded by CS5-40. | 49-34. | Chip board, laminated chip board, and miscellaneous boards for bookbinding purposes. |
| 11-41. | Moisture regains of cotton yarns (second edition). | 50-34. | Binders board for bookbinding and other purposes. |
| 12-40. | Fuel oils (fifth edition). | 51-35. | Marking articles made of silver in combination with gold. |
| 13-42. | Dress patterns (third edition). | 52-35. | Mohair pile fabrics (100-percent mohair plain velvet, 100-percent mohair plain frieze, and 50-percent mohair plain frieze). |
| 14-39. | Boys' button-on waists, shirts, junior and polo shirts (made from woven fabrics) (second edition). | 53-35. | Colors and finishes for cast stone. |
| (E)15-43. | Men's pajamas (made from woven fabrics) (second edition). | 54-35. | Mattresses for hospitals. |
| 16-29. | Wall paper. | 55-35. | Mattresses for institutions. |
| 17-42. | Diamond core drill fittings (third edition). | 56-41. | Oak flooring (second edition). |
| 18-29. | Hickory golf shafts. | 57-40. | Book cloths, buckrams, and impregnated fabrics for bookbinding purposes except library bindings (second edition). |
| 19-32. | Foundry patterns of wood (second edition). | 58-36. | Woven elastic fabrics for use in overalls (overall elastic webbing). |
| 20-42. | Staple vitreous china plumbing fixtures (third edition). | 59-41. | Woven textile fabrics—testing and reporting (third edition). |
| 21-39. | Interchangeable ground-glass joints, stopcocks, and stoppers (fourth edition). | 60-36. | Hardwood dimension lumber. |
| 22-40. | Builders' hardware (nontemplate) (second edition). | 61-37. | Wood-slat venetian blinds. |
| 23-30. | Feldspar. | 62-38. | Colors for kitchen accessories. |
| 24-43. | Screw threads and tap-drill sizes. | 63-38. | Colors for bathroom accessories. |
| 25-30. | Special screw threads. Superseded by CS24-43. | 64-37. | Walnut veneers. |
| 26-30. | Aromatic red cedar closet lining. | 65-43. | Methods of analysis and of reporting fiber composition of textile products (second edition). |
| 27-36. | Mirrors (second edition). | 66-38. | Marking of articles made wholly or in part of platinum. |
| 28-32. | Cotton fabric tents, tarpaulins, and covers. | 67-38. | Marking articles made of karat gold. |
| 29-31. | Staple seats for water-closet bowls. | 68-38. | Liquid hypochlorite disinfectant, deodorant, and germicide. |
| 30-31. | Colors for sanitary ware. | 69-39. | Pine oil disinfectant. |
| 31-38. | Wood shingles (fourth edition). | 70-41. | Phenolic disinfectant (emulsifying type) (second edition) (published with CS71-41). |
| 32-31. | Cotton cloth for rubber and pyroxylin coating. | 71-41. | Phenolic disinfectant (soluble type) (second edition) (published with CS70-41). |
| 33-32. | Knit underwear (exclusive of rayon). | 72-38. | Household insecticide (liquid spray type). |
| 34-31. | Bag, case, and strap leather. | | |
| 35-42. | Plywood (hardwood and eastern red cedar) (second edition). | | |
| 36-33. | Fourdriner wire cloth (second edition). | | |
| 37-31. | Steel bone plates and screws. | | |
| 38-32. | Hospital rubber sheeting. | | |

CS. No.	Item	CS No.	Item
73-38.	Old growth Douglas fir standard stock doors.	89-40.	Hardwood stair treads and risers.
74-39.	Solid hardwood wall paneling.	90- .	(Reserved for power shovels and cranes.)
75-42.	Automatic mechanical draft oil burners designed for domestic installations (second edition).	91-41.	Factory-fitted Douglas fir entrance doors.
76-39.	Hardwood interior trim and molding.	92-41.	Cedar, cypress, and redwood tank stock lumber.
77-40.	Sanitary cast-iron enameled ware.	93-41.	Portable electric drills (exclusive of high frequency).
78-40.	Ground-and-polished lenses for sun glasses (second edition) (published with CS79-40).	94-41.	Calking lead.
79-40.	Blown, drawn, and dropped lenses for sun glasses (second edition) (published with CS78-40).	95-41.	Lead pipe.
80-41.	Electric direction signal systems other than semaphore type for commercial and other vehicles subject to special motor vehicle laws (after market).	96-41.	Lead traps and bends.
81-41.	Adverse-weather lamps for vehicles (after market).	97-42.	Electric supplementary driving and passing lamps for vehicles (after market).
82-41.	Inner-controlled spotlamps for vehicles (after market).	98-42.	Artists' oil paints.
83-41.	Clearance, marker, and identification lamps for vehicles (after market).	99-42.	Gas floor furnaces—gravity circulating type.
84-41.	Electric tail lamps for vehicles (after market).	100-42.	Multiple-coated, porcelain-enameled steel utensils.
85-41.	Electric license-plate lamps for vehicles (after market).	101-43.	Flue-connected oil-burning space heaters equipped with vaporizing pot-type burners.
86-41.	Electric stop lamps for vehicles (after market).	102- .	(Reserved for Diesel and fuel-oil engines.)
87-41.	Red electric warning lanterns.	103-42.	Cotton and rayon velour (jacquard and plain).
88-41.	Liquid-burning flares.	(E) 104-43.	Warm-air furnaces equipped with vaporizing pot-type oil burners.
		105-43.	Mineral wool; loose, granulated, or felted form, in low-temperature installations.
		(E) 106-43.	Boys' pajamas (made from woven fabrics).
		(E) 107-43.	Commercial electric-refrigeration condensing units.

NOTICE.—Those interested in commercial standards with a view toward accepting them as a basis of everyday practice may secure copies of the above standards, while the supply lasts, by addressing the Division of Trade Standards, National Bureau of Standards, Washington, D. C.



